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10/627,324	07/25/2003	Artur Andrzejak	200209179-1	2285

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EXAMINER	
WHIPPLE, BRIAN P	

ART UNIT	PAPER NUMBER
2152	

NOTIFICATION DATE	DELIVERY MODE
03/19/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/627,324	ANDRZEJAK ET AL.	
	Examiner	Art Unit	
	Brian P. Whipple	2152	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-22 and 24-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-17,20-22,24-37 and 40* is/are rejected.

7)☒ Claim(s) *18,19,38 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-2, 4-22, and 24-40 are pending in this application and presented for examination.

Response to Arguments

2. Applicant's arguments filed 12/19/07 have been fully considered but they are not persuasive.

3. Applicant argues Sitbon and Weaver are directed to separate problems and it would not have been obvious to combine Sitbon with Weaver. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, both arts are directed to techniques known to one of ordinary skill in the networking art at the time of the invention. The purpose of combining Sitbon with Weaver is to achieve an effective

utilization of network links, and balance network traffic loads between links, using linear optimization (Weaver: Col. 4, ln. 25-37).

4. Applicant argues Weaver does not indicate how the traffic routing of Weaver might be used to determine which machine of Sitbon has the lightest load or which machine should receive an additional assignment of services. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Sitbon is relied upon for determining the lightest load of a machine and determining which machine should receive an additional assignment of services.

Furthermore, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., determining the machine with the lightest load and determining which machine should receive an **additional** assignment of services) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

5. Applicant argues Examiner's interpretation of the term "integer program" does not fit the plain meaning of the term. Examiner fails to see how the cited material of Sitbon does not satisfy, "a type of optimization problem in which integer variables are defined, one or more constraints are applied and values for the variables are determined in an effort to maximize one or more objectives." Applicant is directed to the rejection below for further elaboration.

6. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the placement of multiple services on multiple nodes simultaneously, as opposed to "the calculation of which machine has the lightest load would need to be repeated") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

7. Applicant argues Sitbon does not disclose transport demand between pairs of services. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In*

re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Sitbon is not relied upon for node pairs, rather Weaver is.

8. As to claim 2, Applicant argues Sitbon fails to disclose placement variables indicating whether a particular service is located on a particular node. Examiner respectfully disagrees. Sitbon discloses each of the placement variables indicating whether a particular service is located on a particular node (Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62 – Col. 5, ln. 9; each of the placement variables are used in summation to indicate whether a particular node should be selected as the location for a particular service). Each of the placement variables is used to determine, indicate, whether a particular service should be located at a particular node.

9. As to claims 9 and 29, Applicant argues the modification of normalizing processing demands and processing capacities has no logical connection to avoiding errors and packet loss. Ensuring the demands on devices in a network and the capacity of devices in a network are normalized, ensures that errors, such as lost packets, related to an overburden on the devices in a network do not occur.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-2, 4-8, 13-17, 20-22, 24-28, 33-37, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sitbon et al. (Sitbon), U.S. Patent No. 5,993,038, in view of Weaver, U.S. Patent No. 6,574,669 B1.

12. As to claim 1, Sitbon discloses a method of determining a placement of services of a distributed application onto nodes of a distributed resource infrastructure (Abstract, ln. 1-5 and 9-14; Col. 1, ln. 6-9) comprising the steps of:

forming communication constraints (Col. 4, ln. 62-64; Col. 5, ln. 4-7), comprising a product of a first placement variable (Col. 4, ln. 66-67), a second placement variable (Col. 5, ln. 1-3), and the transport demand between the services associated with the first and second placement variables (Col. 4, ln. 62-64; the total load is the transport demand; the transport demand is between services, in that the load for a distributed application is balanced across a plurality of machines, as seen in the Abstract, ln. 1-5, implying services are already distributed in the network before the new request for services is made, therefore the load

calculation must be a calculation of the transport demand on services; the variables are placement variables, in that the variables of the equation determine total load, which is in turn used to determine the machine with the lightest load, said services being rendered by said machine);

forming an objective (Col. 3, ln. 66 – Col. 4, ln. 4; he objective is deducing the machine with the lightest load and requesting it render requested distributed application services); and

employing a local search solution to solve an integer program comprising the communication constraints and the objective, which determines the placement of the services onto the nodes (Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62 – Col. 5, ln. 9; the network is searched to determine the machine with the lightest load; the equation of Col. 4, ln. 62-64 is the solution for an integer program, in that a summation of constraint is determined by the application of the relevant machine).

Sitbon is silent on said communications constraints being between node pairs which ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair.

However, Weaver discloses said communications constraints being between node pairs which ensure that a sum of transport demands between a particular node pair does not

exceed a transport capacity between the particular node pair (Abstract, ln. 1-8; Col. 5, ln. 63 – Col. 6, ln. 13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sitbon by using communications constraints between node pairs to ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair as taught by Weaver in order to achieve an effective utilization of network links, and balance network traffic loads between links, using linear optimization (Weaver: Col. 4, ln. 25-37).

13. As to claim 21, the claim is rejected for the same reasons as claim 1 above.

14. As to claim 2, Sitbon discloses a method of determining a placement of services of a distributed application onto nodes of a distributed resource infrastructure (Abstract, ln. 1-5 and 9-14; Col. 1, ln. 6-9) comprising the steps of:

establishing an application model of the services comprising transport demands between the services (Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62-64; the total load is the transport demand; the transport demand is between services, in that the load for a distributed application is balanced across a plurality of machines, as seen in the Abstract, ln. 1-5, implying services are already distributed in the network before the new request for

services is made, therefore the load calculation must be a calculation of the transport demand on services);

forming an integer program (Col. 4, ln. 62-64) that comprises:

a set of placement variables for a combination of the services and that nodes (Col. 4, ln. 62 – Col. 5, ln. 9; the variables are placement variables, in that the variables of the equation determine total load, which is in turn used to determine the machine with the lightest load, said services being rendered by said machine), each of the placement variables indicating whether a particular service is located on a particular node (Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62 – Col. 5, ln. 9; the placement variables are used to indicate whether a particular node should be selected as the location for a particular service);

communication constraints (Col. 4, ln. 62-64; Col. 5, ln. 4-7), comprising a product of a first placement variable (Col. 4, ln. 66-67), a second placement variable (Col. 5, ln. 1-3), and the transport demand between the services associated with the first and second placement variables (Col. 4, ln. 62-64; the total load is the transport demand; the transport demand is between services, in that the load for a distributed application is balanced across a plurality of machines, as seen in the Abstract, ln. 1-5, implying services are already distributed in the network before the new request for services is made, therefore the load calculation must be a calculation of the transport

demand on services; the variables are placement variables, in that the variables of the equation determine total load, which is in turn used to determine the machine with the lightest load, said services being rendered by said machine);

an objective (Col. 3, ln. 66 – Col. 4, ln. 4; the objective is deducing the machine with the lightest load and requesting it render requested distributed application services); and

employing a local search solution to solve an integer program which determines the placement of the services onto the nodes (Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62 – Col. 5, ln. 9; the network is searched to determine the machine with the lightest load; the equation of Col. 5, ln. 62-64 is the solution for an integer program, in that a summation of constraint is determined by the application of the relevant machine).

Sitbon is silent on establishing an infrastructure model of the nodes comprising transport capacities between the nodes; and

said communications constraints being between node pairs which ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair.

However, Weaver discloses establishing an infrastructure model of the nodes comprising transport capacities between the nodes (Col. 4, ln. 25-37; Col. 5, ln. 63 – Col. 6, ln. 13); and

said communications constraints being between node pairs which ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair (Abstract, ln. 1-8; Col. 5, ln. 63 – Col. 6, ln. 13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sitbon by establishing an infrastructure model of the nodes comprising transport capacities between the nodes and using communications constraints between node pairs to ensure that a sum of transport demands between a particular node pair does not exceed a transport capacity between the particular node pair as taught by Weaver in order to achieve an effective utilization of network links, and balance network traffic loads between links, using linear optimization (Weaver: Col. 4, ln. 25-37).

15. As to claim 22, the claim is rejected for the same reasons as claim 2 above.

16. As to claim 4, Sitbon and Weaver disclose the invention substantially as in parent claim 2, including the objective comprises minimizing communication traffic between the nodes (Col. 4, ln. 25-37; the effective utilization of network links and balancing network

traffic loads may be interpreted as indicating that a minimum amount of traffic between nodes is sought).

17. As to claim 24, the claim is rejected for the same reasons as claim 4 above.

18. As to claim 5, Sitbon and Weaver disclose the invention substantially as in parent claim 2, including the application model further comprises processing demands for the services (Abstract, ln. 9-14; Col. 4, ln. 66-67).

19. As to claim 25, the claim is rejected for the same reasons as claim 5 above.

20. As to claim 6, Sitbon and Weaver disclose the invention substantially as in parent claim 5, including the infrastructure model (Weaver: Col. 4, ln. 25-37) further comprises processing capacities for the nodes (Sitbon: Col. 4, ln. 66-67).

21. As to claim 26, the claim is rejected for the same reasons as claim 6 above.

22. As to claim 7, Sitbon and Weaver disclose the invention substantially as in parent claim 7, including the integer program further comprises processing constraints which

ensure that a sum of processing demands for each of the nodes does not exceed the processing for capacity for the node (Abstract, ln. 9-14; Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62-67).

23. As to claim 27, the claim is rejected for the same reasons as claim 7 above.

24. As to claim 8, Sitbon and Weaver disclose the invention substantially as in parent claim 7, including the objective comprises minimizing communication traffic between the nodes (Col. 4, ln. 25-37; the effective utilization of network links and balancing network traffic loads may be interpreted as indicating that a minimum amount of traffic between nodes is sought) and balancing the processing demands on the nodes (Abstract, ln. 9-14; Col. 3, ln. 66 – Col. 4, ln. 4; Col. 4, ln. 62-67).

25. As to claim 28, the claim is rejected for the same reasons as claim 8 above.

26. As to claim 13, Sitbon and Weaver disclose the invention substantially as in parent claim 2, including the application model further comprises storage demands for the services (Sitbon: Col. 5, ln. 1-3).

27. As to claims 14-15 and 33-35, the claims are rejected for the same reasons as claim 13 above.

28. As to claim 16, Sitbon and Weaver disclose the invention substantially as in parent claim 2, including the integer program further comprises placement constraints which ensure that each of the services is placed on one and only one of the nodes (Sitbon: Abstract, ln. 9-14; only the node with the lightest load is selected).

29. As to claim 36, the claim is rejected for the same reasons as claim 16 above.

30. As to claim 17, Sitbon and Weaver disclose the invention as in parent claim 2, including the services reside on the nodes according to a previous assignment (Sitbon: Abstract, ln. 9-14; the service is executed on a selected machine, which is a service residing on a node according to a previous assignment).

31. As to claim 37, the claim is rejected for the same reasons as claim 17 above.

32. As to claims 20 and 40, the claims are rejected for the same reasons as 2, 5-8, and 13-16 above.

33. Claims 9-11 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sitbon and Weaver as applied to claims 6 and 26 above, and further in view of Smith, U.S. Patent No. 5,878,224.

34. As to claim 9, Sitbon and Weaver disclose the invention substantially as in parent claim 6, but are silent on the processing demands and the processing capacities are normalized according to a processing criterion.

However, Smith discloses the processing demands and the processing capacities are normalized according to a processing criterion (Abstract; Col. 11, ln. 18-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sitbon and Weaver by normalizing the processing demands and processing capacities of a node as taught by Smith in order to avoid pushing the total load of a server beyond what it can handle (Smith: Col. 11, ln. 18-29) for the purposes of avoiding errors and packet loss.

35. As to claim 29, the claim is rejected for the same reasons as claim 9 above.

36. As to claim 10, Sitbon, Weaver, and Smith disclose the invention substantially as in parent claim 9, including the processing criterion comprises an algorithm speed (Smith: Col. 8, ln. 63 – Col. 9, ln. 10).

37. As to claim 30, the claim is rejected for the same reasons as claim 10 above.

38. As to claim 11, Sitbon, Weaver, and Smith disclose the invention substantially as in parent claim 9, including the processing criterion comprises a transaction speed (Smith: Col. 9, ln. 48 – Col. 10, ln. 7; Col. 10, ln. 33-40).

39. As to claim 31, the claim is rejected for the same reasons as claim 11 above.

40. Claims 12 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sitbon, Weaver, and Smith as applied to claims 9 and 29 above, and further in view of Ben Nun et al. (Ben Nun), U.S. Patent No. 6,928,482 B1.

41. As to claim 12, Sitbon, Weaver, and Smith disclose the invention substantially as in parent claim 9, including finding processing capacities of nodes (Sitbon: Abstract, ln. 9-14; Col. 4, ln. 66-67) and different types of nodes being normalized according to the processing

criterion (Smith: Abstract; Col. 11, ln. 18-29), but are silent on finding the processing capacities of the nodes according to a look-up table.

However, Ben Nun discloses finding processing capacities of nodes according to a look-up table (Abstract; Fig. 5; Col. 15, ln. 23-41).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Sitbon, Weaver, and Smith by finding the processing capacities of the nodes by using a look-up table as taught by Ben Nun in order to determine and store a mapping logic in a standard form of storage.

42. As to claim 32, the claim is rejected for the same reasons as claim 12 above.

Allowable Subject Matter

43. Claims 18-19 and 38-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

44. The following is a statement of reasons for the indication of allowable subject matter: prior art disclosing a step of assessing reassignment penalties for service placements that differs from the previous assignment could not be found.

Additionally, this would appear to run counter to the prior art cited as they primarily deal with dynamic reassignment for purposes such as load balancing and faults. Penalizing reassignment would seem to run counter to the objectives of these prior arts.

Conclusion

45. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

46. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Whipple whose telephone number is (571)270-1244. The examiner can normally be reached on Mon-Fri (8:30 AM to 5:00 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bunjob Jaroenchonwanit can be reached on (571) 272-3913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian P. Whipple
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Examiner, Art Unit 2152
3/7/08

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